

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. 20231

Inventor: **Kreisler LAU, et al.**

Examiner: **J. Mullis**

Serial No: **Div. of 09/545,058**

Art Unit: **1711**

Filed: **April 7, 2000**

For: **Low Dielectric Constant
Organic Dielectrics Based on
Cage-Like Structures**

PRELIMINARY AMENDMENT

Box Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Mr. Mullis:

Please enter the following preliminary amendment:

IN THE CLAIMS

Please cancel claims 1-18 and add the following claims:

22. (Added) A low dielectric constant material, comprising:
- a first backbone having a first aromatic moiety comprising a phenyl and a first reactive group;
 - a second backbone having a second aromatic moiety comprising a phenyl and a second reactive group, wherein the first and second backbones are crosslinked without an exogenous crosslinker via the first and second reactive groups in a crosslinking reaction; and
 - a cage structure covalently bound to at least one of the first and second backbones, wherein the cage structure comprises at least 10 atoms, and wherein at least one of the first and second reactive groups is ethynyl.

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23. (Added) The low dielectric constant material of claim 22 wherein the cage structure comprises at least one of an adamantane and a diamantane.
24. (Added) A layer comprising said low dielectric constant polymer of claim 21.
25. (Added) The layer of claim 24 wherein said aromatic portion comprises phenyl.
26. (Added) The layer of claim 25 wherein said cage structure comprises substituted or unsubstituted adamantane or substituted or unsubstituted diamantane.
27. (Added) A film comprising said low dielectric constant polymer of claim 21.
28. (Added) The film of claim 27 wherein the thickness of the film is less than 100 μ m.
29. (Added) The film of claim 28 wherein the dielectric constant is less than 3.
30. (Added) The film of claim 29 wherein said aromatic portion comprises phenyl.
31. (Added) The film of claim 30 wherein said cage structure comprises substituted or unsubstituted adamantane or substituted or unsubstituted diamantane.
32. (Added) An insulator comprising said low dielectric constant polymer of claim 21.
33. (Added) The insulator of claim 32 wherein said aromatic portion comprises phenyl.
34. (Added) The insulator of claim 33 wherein said cage structure comprises substituted or unsubstituted adamantane or substituted or unsubstituted diamantane.
35. (Added) An integrated circuit comprising the layer of claim 26.
36. (Added) An integrated circuit comprising the film of claim 31.
37. (Added) An integrated circuit comprising the insulator of claim 34.

IN THE SPECIFICATION

Insert the following before "Field of the Invention":

"This application is a divisional of pending application Serial Number 09/545,058, filed

April 7, 2000."

REMARKS

No new matter was added by this preliminary amendment.

Please use 30-4907 DIV (4780) as the docket number for this application.

Please mail all official correspondence to the following address:

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1440 N. Harbor Blvd., Suite 706
Fullerton, CA 92835

REQUEST FOR ALLOWANCE

Claims 19-37 are pending in this application. The applicants request allowance of all pending claims.

Respectfully submitted,

Fish & Associates, LLP

By: 

Robert D. Fish
Reg. No. 33,880

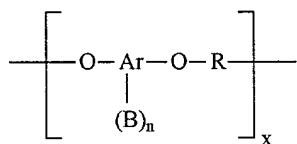
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

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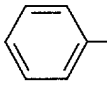
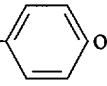
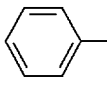
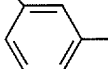
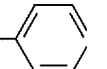

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CLAIMS

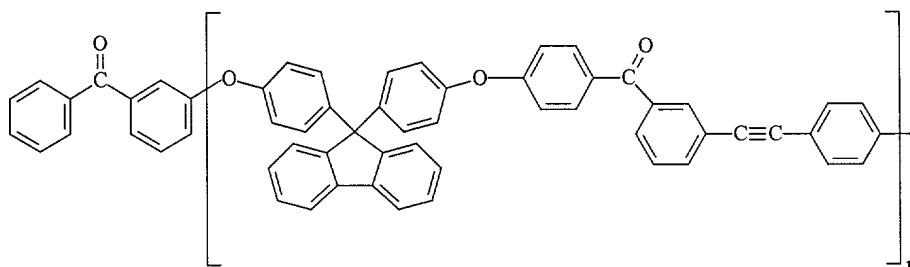
19. A low dielectric constant polymer having the structure:



wherein B is  (Adamantane)_n or  (Diamantane)_n with n = 1-3, and
wherein x = 1-10³,

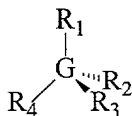
wherein R is -C≡C- or -C(=O)--C≡C-, and Ar is 

20. A low dielectric constant polymer having the structure:



wherein n=1-10³.

21. A thermosetting monomer having the structure:



wherein G is a cage structure, and wherein at least two of R₁-R₄ comprise an aromatic portion and a reactive group, respectively; and

wherein at least one of the reactive groups of a first monomer reacts with at least one of the reactive group of a second monomer to produce a low dielectric constant polymer.

22. A low dielectric constant material, comprising:

a first backbone having a first aromatic moiety comprising a phenyl and a first reactive group;

a second backbone having a second aromatic moiety comprising a phenyl and a second reactive group, wherein the first and second backbones are crosslinked without an exogenous crosslinker via the first and second reactive groups in a crosslinking reaction; and

a cage structure covalently bound to at least one of the first and second backbones, wherein the cage structure comprises at least 10 atoms, and wherein at least one of the first and second reactive groups is ethynyl.
23. The low dielectric constant material of claim 22 wherein the cage structure comprises at least one of an adamantane and a diamantane.
24. A layer comprising said low dielectric constant polymer of claim 21.
25. The layer of claim 24 wherein said aromatic portion comprises phenyl.
26. The layer of claim 25 wherein said cage structure comprises substituted or unsubstituted adamantane or substituted or unsubstituted diamantane.
27. A film comprising said low dielectric constant polymer of claim 21.
28. The film of claim 27 wherein the thickness of the film is less than 100 μ m.
29. The film of claim 28 wherein the dielectric constant is less than 3.
30. The film of claim 29 wherein said aromatic portion comprises phenyl.
31. The film of claim 30 wherein said cage structure comprises substituted or unsubstituted adamantane or substituted or unsubstituted diamantane.

32. An insulator comprising said low dielectric constant polymer of claim 21.
33. The insulator of claim 32 wherein said aromatic portion comprises phenyl.
34. The insulator of claim 33 wherein said cage structure comprises substituted or unsubstituted adamantane or substituted or unsubstituted diamantane.
35. An integrated circuit comprising the layer of claim 26.
36. An integrated circuit comprising the film of claim 31.
37. An integrated circuit comprising the insulator of claim 34.